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VOL. XVIII AIR CORPS NEWS LETTER NO. 13.

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The chief purpose of this publication is to distribute information on aeronautics to the flying personnel in the Regular Army, Reserve Corps, National Guard, and others connected with aviation.

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DEVELOPMENT AND PROCUREMENT OF MILITARY AIRCRAFT

It is a universal experience that individuals engaged in different specialized phases of any one activity often have difficulty in understanding each other's problems. This usually takes the form of a claim of lack of cooperation when more often it is a lack of mutual understanding. In the Air Corps this difficulty appears in providing suitable aircraft for the users of the airplanes. A worth while characteristic noted as a new technical development may be desired by the service and requested by it. Procurement and engineering organizations then seem to overlook it until it just happens to appear, as what may seem to be an obsolete feature, some years later. This may all be quite routine and the time loss entirely legitimate. On the other hand, those in closer touch with technical developments may foresee definite changes in requirements but, due to a lack of general understanding, be unable to sell the idea to the Service. Air Corps development history has been full of such antagonistic incidents.

In an effort to throw a little light on the dark subject of those years between the first expression of an idea and its delivery to the Service as standard equipment, the following descriptive outlines are offered:

The first one which follows immediately covers the subject from the fundamental considerations as far as the "Type Specification" and its publication. This will be followed by subsequent articles explaining, briefly, first, the extent of the experimental stage and, second, the details of the evaluation, contracting and construction of airplanes for service procurement.

The procurement of military airplanes like airplanes themselves must be a compromise of several features. There are two exactly opposite fundamental considerations which must first be reconciled. The first is the reduction to concrete material of an expression of the Service need. The second is the development of an item to a usable form and then building the tactics around the resultant equipment.

If the sources of information are of a high order of reliability and extremely foresighted, the first arrangement is probably the best. The difficulty, however, lies in visualizing the appearance of an article to be built to meet these expressed requirements. In the reduction to practice of an idea, all the loosely phrased and occasional haphazard requirements are built in just as surely as the soundest and most concisely stated considerations. For this reason, our military airplanes are often handicapped in weight, size, and performance by having included features which originally were expressed as merely desirable adjuncts to the fundamental creation.

Therefore, it is occasionally advantageous to start out on a development program on a pure type, not handicapped in this manner, so that some concrete example of the "thoroughbred" is available as a model from which to start. It is just as sound to work on this basis, meeting only one fundamental functional requirement and then modify the airplane, as it is to take an expression of a lot of needs, build to meet these, and then refine the product to approach the ideal form. The criterion for determining the procedure to be followed should be, first, the degree of perfection of the existing tactics versus the rate of development of technical progress and, second, the ability of those expressing these requirements to rationalize the situation and arrange a correct order of importance of the several features versus the ability of those charged with developing a type to work along a logical path leading to a definite practicability.

It is, indeed, a delicate problem, and may be summed up in some such fashion as this. Many a technical article actually produced in metal, wood, or fabric bears little resemblance to the article intended by the originator of the idea, and likewise many a technical development of tremendous academic interest has no immediate practical application.

Another compromise which must be made is that between training requirements and expected tactical requirements. It is certain that immediately following the first stages of any military conflict, a number of new and definite requirements will be established, and then the corresponding technical developments will have to take place. There are several ways of handling this situation. The first is to concentrate upon the training requirements of peace-time development and include as many of the anticipated service features as possible. The second is to concentrate on estimated service re-

quirements and include as many peace-time training features as possible. The third is to build solely to training requirements, keeping a small scale development program of pure service types under way. Whatever the course followed, it is certain that the inclusion of any extraneous feature not required for the performance of the established mission is a distinct handicap. The factors determining which plan to follow are many and include (1) the possibility of an emergency occurring in the near future; (2) the time necessary to establish emergency production; (3) its rate after establishment; (4) the state of training of the Air Force; and (5) the accuracy with which emergency conditions can be estimated.

Still another compromise exists in balancing the use of tried equipment of inferior performance against the use of development equipment of promise but of uncertain dependability. Faster development of equipment is always obtained when this equipment is in actual service, but it handicaps the operating personnel to a marked degree in a fixed training schedule. The decision as to policy again depends on whether the service can assist in the development or whether the necessities of training and preparedness for expected emergencies require some sacrifice of aircraft performance in order to secure service dependability.

There is one more fundamental characteristic in the development of aircraft that affects all the other factors and must always be considered. This is the element of time. An idea expressed today will be a service item in from three to five years elapsed time. In the meantime, there is a maze of development and procurement detail to be gone through. By far the greatest time requirement is for the stage from initial expression to the service test article. Previous experiences have indicated that the production of existing types can reach astounding figures in a relatively short time, but there is no short cut in the experimental and development stages.

The Air Corps system as it now exists is essentially one of compromise, leaning at all times to the practical side and taking its cues from the service, but restricted by budget limitations.

There is at all times a "design study" development going on which is intended to anticipate requirements by several years. Little restraint is shown here other than to base the requirements on the last existing expressions from the service. However, all technical developments, regardless of their service record, may be considered as fair means to achieve the ultimate at this stage.

These studies indicate the fields of investigation which apparently are not worth further development, as well as establishing the approximate form or, in some cases, almost the exact form of future procurement. The "Directives" or "Approved Type Characteristics," which form the immediate basis for specifications, are the expressions of the service through the agencies of "Boards," as approved by the Secretary of War and correlative to the assigned missions of the Air Corps in the scheme of National Defense. These "Boards" have been in the past generally convened for the purpose of studying existing experimental aircraft. They then makerecommendations for future development. At this time the relative importance of the numerous characteristics are determined and the item of equipment chosen. This is usually a matter of altering the requirements of existing specifications. All too often there is a mere adding of items and requirements and not modification. One of the greatest difficulties existing at present is that the recommendations of any one board or group cannot be produced in a serviceable airplane for at least two more years and therefore appears obsolete to the Board called to flight test it. For this reason it appears that it would be preferable to have a nearly permanent type board, which could accustom itself to this long-range planning and, in addition, keep its recommendations modernized or even slightly futuristic. In some instances where an old Directive has been outdistanced by the performance of modern airplanes a new set of increased performance figures are submitted to be approved as "Approved Type Characteristics."

These "Directives" or "Characteristics" include all the specific items of performance and equipment and then, using the last previous specification, a new "Type Specification" is written, based upon these "minimum" requirements.

This Type Specification is a reduction to technical terms of the recommendations made by the service through its representatives. This Specification tells "what" but not "how." The manufacturer must make up his own description (Detail Specification) telling in detail how he proposes to accomplish the desired results. The drafting of these Type Specifications is a tedious engineering job, requiring the close coordination of all the separate units charged with the component parts of an airplane. There is in addition a "Handbook of Instructions for Airplane Designers," which is kept up to date and serves not only as a guide but includes definite demands and criteria in the way of principles of construction, strength, safety features, and installations which have been shown to be satisfactory in service. In this way a multitude of features which would turn out to be unsatisfactory in service are eliminated before the airplane ever reaches the drawing-board stage.

The Type Specification lists the engine that may be used; it lists the equipment

required; and in general gives quite detailed statements of the portions for which the Air Corps itself is responsible.

Under existing procurement procedure there cannot be any submission of data for preliminary approval or comment. It all has to be submitted for "information only." Since the details cannot be passed upon for agreement with Air Corps standards of practice, the Type Specification itself must become more binding.

This Specification as written must then be approved by the Secretary of War and is then ready for promulgation by the procurement organization. The minimum of time which will have elapsed will be from two to six months.

These Specifications are then attached to a proposal and the Industry is invited to submit bids on airplanes purporting to meet them.

These bids will be received from two months to a year later, depending on whether the Type Specifiaation covers a production model already well developed, or an experimental type, or simply a "design."

Since at the present time each procurement must be a separate competition, there can be no assurance that a definite line of development has taken place or that a definite line of improvement will ever take place.

This completes the first stage of any procurement program going from the source of the requirements (the expressions of the service), through the reduction of these expressions to a concrete form for procurement (the Type Specification), to the reduction of these expressions to practice in the form of complete aircraft, designs, and specifications, submitted in a competition in response to the pertinent Circular Proposals. The time elapsed will have been from six months to a year and a half for this phase.

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HONORARY DEGREES AWARDED TO SECRETARY OF WAR AND CAPTAIN STEVENS

During the Commencement Exercises of the 1935 graduating class of the South Dakota State School of Mines, Rapid City, S.D., the Hon. George Henry Dern, Secretary of War, and Captain Albert W. Stevens, Air Corps, were among several other men prominent in the field of science, awarded honorary degrees.

The honorary degree of Doctor of Engineering was conferred upon the Secretary of War for his high achievements in the profession of mining engineering, his inventions in the field of ore treatment, and his record of eminent statesmanship as State Senator, Governor of Utah and Secretary of War.

Captain Stevens received the honorary degree of Doctor of Science in recognition of his ability as a leader and as a scientific observer of the greatest of stratosphere flights. The regents of Education of South Dakota, in awarding this degree to Capt. Stevens, stated: "Possibly an admiring public thinks of Captain Stevens principally as a courageous explorer of the upper air, but he has received wide recognition and many honors for his outstanding accomplishments in engineering and science as well. Particularly in the field of aerial photography, both in war and in peace, has he made important contributions. His photographic surveys of large areas of South America, the first photograph ever made of the moon's shadow upon the earth during a total eclipse of the sun, and his long distance photographs made by the infra red method are some of his well known achievements."

Dr. Lyman James Briggs, Director of the National Bureau of Standards, who received the honorary degree of Doctor of Engineering, delivered the commencement address, during the course of which, touching upon the forthcoming Stratosphere Flight, he praised the National Geographic Society for making the flight possible by financing the expedition and attending in an executive capacity to endless vitally important details, and the Army Air Corps for making it possible through detailing flight personnel of unsurpassed experience and ability, together with airplanes and special equipment for the use of the expedition.

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APPROPRIATION EXPECTED FOR KELLY FIELD

The Associated Press recently carried a dispatch to the effect that $524,350. was to be allotted to Kelly Field from the Work Relief Funds. According to the dispatch, this fund was to be expended as follows:

$ 68,250.00	for Gas and Oil storage and distribution.
52,400.00	for a miniature range.
170,000.00	for paved aprons and runways.
180,000.00	for improvements to landing field and building area.
3,000.00	for machine gun butts.
50,700.00	for general repairs to buildings and utilities.

Official confirmation of these allotments has not been received at this writing.

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The Air Corps, as of May 31, 1935, had 116 enlisted men holding flying ratings - 109 pilots and 7 observers. Since then, 39 of these pilots were commissioned second lieutenants in the Air Corps.

BILL INTRODUCED CREATING A DEPARTMENT OF AIR SERVICE

Hon. Ernest Lundeen, Member of Congress from Minnesota, introduced in the House of Representatives on June 29th, a Bill, H.R. 8729, to the following effect:

"That there is hereby created an executive department in the Government, to be called the 'Department of Air Service', and a Secretary of Air Service who shall be the head thereof and who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall receive a salary of $15,000 per annum and whose tenure of office shall be like that of the heads of the other executive departments; and section 158 of the Revised Statutes is hereby amended to include such Department, and the provisions of Title 4 of the Revised Statutes, including all amendments thereto, are hereby made applicable to said Department. The purpose of the Department of Air Service shall be to promote, develop, and regulate the navigation of the air for the benefit of the people and the Government of the United States. The said Secretary shall cause a seal of office to be made for the said Department, of such device as the President shall approve, and judicial notice shall be taken of the said seal.

Sec. 2. That there shall be in said Department an Assistant Secretary of Air Service, to be appointed by the President, who shall receuve a salary of $12,000 per year. He shall perform such duties as shall be prescribed by the Secretary or required by law. There shall also be one Chief Clerk and a disbursing clerk, and such other clerical assistants, inventors, inspectors, experts, scientists, and special agents as may from time to time be provided for by Congress.

Sec. 3. That the following offices, bureaus, divisions, and branches of the Government are hereby transferred to the Department of the Air Service and the same shall hereafter remain under the jurisdiction and supervision of such Department:

(a) The Air Corps of the Army;
(b) The Naval Flying Corps in the Department of the Navy;
(c) The Bureau of Aeronautics in the Department of the Navy;
(d) The Bureau of Air Commerce in the Department of Commerce;
(e) The military air stations;
(f) The naval air stations; and
(g) All agencies of the Government connected with or supervising the production or procurement of aircraft or aircraft supplies for the United States or any agency thereof.

Sec. 4. That the official records and papers now on file in and pertaining exclusively to the business of any bureau, office, department, or branch of the public service in this Act transferred to the Department of Air Service, together with the furniture and apparatus now in use in such bureau, office, department, or branch of the public service shall be, and hereby are, transferred to the Department of Air Service.

Sec. 5. That the Secretary of Air shall have charge in the buildings or premises occupied by or appropriated to the Department of Air Service, of the library, furniture, fixtures, records, and other property pertaining to it or hereafter required for use in its business. He shall be allowed to expend for the purchase of buildings, materials, machinery, vehicles, vessels, and apparatus required for the operations of the air service in promoting, developing, and regulating the navigation of the air, and for periodicals and for the purposes of the library and for rental of appropriate quarters for the accommodation of the Department of Air Service within the District of Columbia, and for all other incidental expenses, such sums as Congress may provide from time to time: Provided, however, That where any office, bureau, or branch of the public service transferred to the Department of Air Service by this Act is occupying rented buildings or premises it may still continue to do so until other suitable quarters are provided for its use: Provided further, That all officers, clerks, and employees now employed in any of the bureaus, offices, departments, or branches of the public service in this Act transferred to the Department of Air Service are each and all hereby transferred to said department at their present grades and salaries, except where otherwise provided in this Act: And provided further, That all laws prescribing the work and defining the duties of the several bureaus, offices, departments, or branches of the public service by this Act transferred to and made a part of the Department of Air Service shall, so far as the same are not in conflict with the provisions of this Act, remain in full force and effect, to be executed under the direction of the Secretary of Air Service.

Sec. 6. That all duties performed and all power and authority now possessed or exercised by the head of any executive department in and over any bureau, office, officer, board, branch, or division of the public service by this Act transferred to the Department of Air Service, or any business arising therefrom or pertaining thereto, or in relation to the duties performed by and authority conferred by law upon such bureau, officer, office, board, branch, or division of the public service, whether of an appellate or revisory character or otherwise, shall hereafter be vested in and exercised by the head of the said Department of Air Service.

Sec. 7. That the Secretary of Air Service shall annually, at the close of each fiscal year, make a report in writing to

Congress, giving an account of all moneys received and disbursed by him and his Department and describing the work done by the Department. He shall also, from time to time, make such special investigations and reports as he may be required to do by the President, or by Congress, or which he himself may deem necessary.

Sec. 8. That the Secretary of Air Service shall investigate and report to Congress a plan of coordination of the activities, duties, and powers of the office of the Secretary of Air Service with the activities, duties and powers of the present bureaus, commissions, and departments, so far as they relate to the air service and the navigation of the air, in order to harmonize and unify such activities, duties, and powers with a view to further legislation, to further define the duties and powers of such Department of Air Service.

Sec. 9. That this Act shall take effect from and after the date of its passage, and all Acts or parts of Acts inconsistent with this Act are hereby repealed.

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WASHINGTON NATIONAL GUARD AIRMEN RETURN FROM ENCAMPMENT

By the News Letter Correspondent

Machine guns cracked five miles out over the Pacific Ocean; airplane motors droned over Camp Murray on day and night patrols; the Fort Lewis airdrome belched up dirt from ground gunnery practice, and the photographic and radio stations bustled with activity for a two weeks period as the 41st Division Aviation, Washington National Guard, participated with troops from Washington, Oregon, Idaho and Montana in the annual Division encampment at Camp Murray and Fort Lewis, Washington, from June 11th to 25th.

It was the first National Guard division encampment to be held in the Northwest since the World War and, under the command of General White, Adjutant General of Oregon, the 7600 Guardsmen moved into camp with precision. Except for one Infantry regiment, practically all of the troops moved by motor caravan, using trucks issued just before the camp.

Enlisted personnel of the Division Aviation moved to Camp with the 161st National Guard Infantry regiment from Spokane, Wash., via the Northern Pacific Railroad. Six pilots with enlisted passengers flew the Douglas Observation planes to camp, arriving over Fort Lewis just as the Air Corps troops were detraining.

Arriving in camp, the Division Aviation learned that it was to have Col. Roy Kirtland, Air Officer, 9th Corps Area, Presidio of San Francisco, Calif., as Division Air Officer; and Captains Joe Bayley, Instructor of the California National Guard, and Guy B. McNeal, of Crissy Field, Calif., as inspectors during the encampment.

Captain Bayley flew a Douglas Observation plane to Fort Lewis for use by the 41st Division Aviation, making a total of seven airplanes for the encampment.

Reaching the Fort Lewis airdrome at 10:00 a.m., June 11th, Captain Claude Owen, Operations Officer, started his first tow target gunnery missions at 1:00 p.m.

Because of the populated areas in Western Washington, it was necessary to conduct the gunnery missions five miles out over the Pacific Ocean, which was an hour's flight from Fort Lewis, and necessitated the use of life preservers by all persons on these missions.

Despite adverse weather conditions, rain, fog and low hanging clouds, all phases of the tow target gunnery were fired by both front and rear gunners.

With gunnery missions both in the forenoon and afternoon on the regular schedule, the remaining five airplanes were used in cooperative missions with other arms of the service. Artillery fire was adjusted by radio for the 146th and 148th Field Artillery, as well as the Coast Artillery at Forts Casey and Worden.

Having just received four of the new SCR AA 185 radio sets for airplanes and the SCR AA 186 ground set before going to camp, much attention was paid to radio communication, both code and voice. The old SCR 134 sets were used in two airplanes, making radio communication possible in six of the seven airplanes. A requirement laid down by Major Robin A. Day, Air Corps, Commander-Instructor, was that on every flight each airplane was to check in with the ground station as soon as possible after the take-off.

The new radio sets proved a revelation to the officers who, although requiring some time thoroughly to acquaint themselves with their operation, found such operation easy and very effective before the camp was over.

Flying started every morning at 7:30 a.m., and continued until 9:00 a.m. Under the program of operations, it was not necessary to hold any airplanes on the ground during the day for their 20 and 40-hour checks, these checks being made at night.

Intense interest in the camp came with the execution of the 81st Brigade problem, which took ground troops into the field for a night advance. Three airplanes were requested for Red and Blue patrol by General Carlos Pennington, Brigade Commander. The patrols started at 4:00 p.m., and continued throughout the night until 8:00 a.m. the following morning. It was during these problems that both the air and ground forces learned considerable about the tactics of the other.

Red airplanes were assigned the duty of

observing the advance during the night. As the doughboys advanced through the woods into semi-open country, parachute flares were dropped with considerable effectiveness on the ground forces, who were not visible to the airplanes.

The Red ground forces were represented by various panels, and small details of men, who constantly moved the panels. Each movement was sent by code communication to the Blue Army. At dawn, although it was raining, the Blue Army called for photographs showing the position of the Red Army.

It was both pleasing and surprising to the Photographic Section, commanded by Lieut. H. R. Wallace, that pictures taken under such adverse conditions at 4:30 a.m., showed the enemy panels so clearly. The pictures were taken on a 30th and 50th of a second. Both obliques and verticals were taken.

Great secrecy surrounded the Division problem, which started with the issuance of orders that no one leave camp for 48 hours. All orders for the problem were issued over the radio net. In this problem the Red airplane carried long Red streamers, and was given the particular duty of photographing every movement of the Blue Army, in order to impress upon the ground troops the extreme care that must be used in maneuvering on the ground.

The two Blue airplanes were assigned the duty of observing the panel movements of the Red ground force, and reporting these movements by radio, drop and pickup messages and overlays. On these problems Captain McNeal acted as Division Air Officer, Captain Bayley as Red Air Officer and Colonel Kirtland as Division Air Force Umpire. Major Day was left to command his air force, which kept an up-to-date situation map of both problems.

Despite the fact that the Fort Lewis airdrome is not lighted, night flying operations were conducted off this field during the problems. Ground crews were kept on the alert to see that highway "pots" were burning all night. These pots were used to outline the airdrome, which is being considerably enlarged under the direction of Lieut. Davis, commander of the Fort Lewis Regular Army corps detachment.

Every cooperation was given the National Guard flyers by the Fort Lewis detachment, which was at Ilwaco, Wash., conducting their gunnery when the camp started. The photographic shack was thrown open to the Guardsmen, as was the Fort Lewis hangar and gassing facilities.

During the only two photographic days of camp, a mosaic was made of the Camp Murray-Fort Lewis reservations for the Division Commander. The War Department request for verticals and obliques of all airports in Western Washington was complied with, and the Photographic Section photographers were busy fulfilling the requests of ground troops for various kinds of pictures.

The official field inspection was made by Colonel Kirtland, who expressed satisfaction with both men, officers and equipment. The troops were mustered by Captain McNeal, who was the camp inspector.

Governor Charles H. Martin, of Oregon, joined with Governor Clarence D. Martin, of Washington, in the official review of all troops at Fort Lewis, where 35,000 persons saw the largest review in years. General Paul B. Malone, Commanding General of the Ninth Corps Area, and General Rosenbaum, Commander of Fort Lewis, were on the reviewing line.

As the last foot troops passed the reviewing stand, two 3-ship formations came low over the parade ground as observers stood at salute to the reviewing officers.

The speed with which aerial photographs can be taken, developed and delivered back to their destination was demonstrated to the two Governors by the 116th Photographic Section. A picture was taken as the first troops passed the reviewing stand. In 20 minutes it was delivered by airplane at the feet of the two State Executives bearing the same name. An hour and 50 minutes constituted the time required for the parade to pass in review.

"You've had a most splendid camp, and I want to congratulate you on your organization," Colonel Kirtland stated to Major Day when bidding him good bye. In this remark both Captains Bayley and McNeal concurred.

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PURSUIT PLANES TESTED AT HIGH ALTITUDES

Major C.V. Haynes, Air Corps, recently conducted tests flights at Langley Field, Va., on P-6D and P-12K airplanes. In testing the turbine supercharger, the P-6D reached an altitude of 34,000 feet with the propeller set at 21.5° pitch. At that altitude the gas consumption was between 40 and 50 gallons per hour and, incidentally, the weather temperature was 50° below zero. The best rate of climb was between 15,000 and 20,000 feet. The peak in air speed was found to be at 22,000 feet, with a maximum of 218 miles per hour.

The P-12K, equipped with a ten to one blower, reached 26,500 feet. In combat against the P-6D, it demonstrated superiority in maneuverability up to 15,000 feet. Above this altitude, the P-6D was superior. In combat with the P-12E, P-6E and P-26, the P-12K proved itself to be superior at any altitude.

In acrobatic flying, the P-12K is almost perfect. The motor will not cut out in

any position, and the elimination of a carburetor enables the motor to clean itself of small quantities of water in the gasoline. Although its full throttle air speed is a little more than that of the P-12E, the increased rate of acceleration is astonishing.

One chief difficulty encountered with the P-12K has been the inability to keep the air and gasoline controls properly adjusted. And the discharge nozzle screens have given some trouble by fouling easily. But it's a real motor, judging from the one that has just topped 288 hours without overhaul.

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CONTRACT AWARDED FOR TRAINING PLANES

Hon. Harry H. Woodring, Assistant Secretary of War, recently announced the award for 26 Primary Training airplanes to the Stearman Aircraft Company of Wichita, Kansas, in the total amount of $243,578.

The circular proposal for this type of airplane was issued to the industry on August 20, 1934, with the opening date of April 22, 1935.

In accordance with normal procedure, the airplane on which the bid was reveived was evaluated by means of actual flight tests conducted by a Board of Officers and, in view of the fact that it represented a marked advance in Primary Training type development, the contract was awarded for these airplanes. The total amount also includes a limited number of spare parts.

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GUNNERY PRACTICE FOR 33RD PURSUIT SQDN.

The 33rd Pursuit Squadron, stationed at Langley Field, Va., completed a week of gunnery practice at Virginia Beach, Va., on June 22nd, with most satisfactory results. The entire squadron flew to Virginia Beach on the morning of June 17th and set up camp at the National Guard Airport.

Most of the first day was spent in arranging and organizing the camp. On the following day, however, the routine began in earnest. The ships were in the air and on their various missions incident to the gunnery practice by 4:30 in the morning. Most of the flying was completed by ten o'clock, and the servicing of the ships completed by eleven, after which the men were permitted to indulge in the various forms of recreation offered at Virginia Beach proper.

The squadron was rationed with a detachment of the 58th Service Squadron, and it is doubted if any member of the organization had any complaint to make concerning the food served.

On June 21st, the squadron proceeded to Rocky Mount, N.C., for the dedication of the municipal airport at that city, returning the following morning to Virginia Beach. A number of the enlisted men of the squadron returned to Langley Field on Saturday, June 23rd, the remainder returning Monday morning.

The News Letter Correspondent believes that the gunnery practice was a success, as shown by the scores made by the officers and cadets, and, further, that with all the conveniences and amusements to be found at Virginia Beach, everyone must have had a pleasant time.

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IMPROVEMENTS AT POPE FIELD, FT. BRAGG.

Within the last nine months, many improvements have been made at Pope Field, Fort Bragg, N.C., under the direction of the new commanding officer, Captain E.P. Gaines, Air Corps. A few of the more important improvements are as follows:

An 800-foot drainage system which has four circular brick-lined manholes; partitions with burned lined finish in the operations office which divide it into an operations office, an engineering office and a waiting room for pilots; the planting of 81 pecan trees bordering the street adjacent to the barracks and officers' quarters; planting of 50 peach trees and a 5-acre garden for the organization mess; the clearing and leveling of an extension to the airship field which increases its size to 2,000 x 1,000 feet and makes it large enough to permit heavily loaded airships to take off by dynamic lift.

It is rumored that a 24-hour teletype weather station will soon be in service at the field, completing the New York - Miami chain. The Department of Commerce will install the teletype system, and the Balloon Squadron and Flight "C" men will maintain the station.

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AIR SICKNESS ATTACKS WEST POINTERS

Persons traveling in airplanes under bumpy air conditions are just as susceptible to air sickness as ocean voyagers are subject to sea sickness when the going is rough. According to the Langley Field Correspondent, bumpy air conditions around Mitchel Field, N.Y., have caused much distress to a large percentage of the first classmen of the United States Military Academy who are now at that field receiving familiarization flights in airplanes of the Second Bombardment Group, commanded by Lieut.-Colonel Charles B. Oldfield. It is to this epidemic of air sickness that the News Letter Correspondent attributes the increase in the number of man hours devoted to airplane maintenance work.

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Mr. Lee Smith recently piloted a new Vultee fast transport plane to Langley Field for inspection by General Andrews and his staff. Major Alec Seversky arrived in his new two-place Pursuit plane for a similar inspection.

FAST WORK IN CHANGING ENGINES

According to the News Letter Correspondent from Pope Field, Fort Bragg, N.C., Flight "C," 16th Observation Squadron, stationed at that post, has set a record on engine changing, and he then adds: "Anyway, it is believed to be a record for an organization of its strength of 28 men at the time of the occurrence.

The record breaking engine change was made while the Flight was on maneuvers at Fort Benning, Ga., with the 8th Infantry Brigade, May 6-18, 1935. In an elapsed time of 11 hours and 15 minutes, an engine was procured by truck from Maxwell Field, almost 100 miles away, the damaged engine removed, and the new one installed and ready to run."

A letter was received from Brigadier-General R. O. Van Horn, Commanding the 8th Brigade (Reinforced) commending six members of Flight "C" and two members of the Second Balloon Squadron for this achievement, viz: 2nd Lieuts. Dudley E. Whitten, John C. Covington, Master Sgt. Samuel E. Lunday, Staff Sgt. Frank Hall, Sergeant Jesse Webb, Privates Gordon T. Kight, Samuel P. Schaaf and Deams C. Pearce. The letter goes on to say:

"On the morning of May 8th, the engine in O-1G airplane No. 3 began to throw oil badly and gave other indications of being in a dangerous condition. Arrangements were made with Maxwell Field to supply a new engine and at 3:00 p.m. that day Lieut. Whitten and Sgt. Webb departed by truck. They were back at Fort Benning with the engine at 10:50 that night, and by 2:00 p.m. the next day this engine was installed and running. At about 2:30 p.m., the crew chief informed the Commanding Officer, Flight "C," that the crankcase of the newly installed engine was cracked. In the face of this disheartening turn of events, Lieut. Covington and Private Pearce departed for Maxwell Field by truck for another engine at 3:15 p.m. They were back at Fort Benning at 10:30 that night, and a crew of four, consisting of Sgt. Lunday, Sgt. Hall, Pvt. Schaaf and Pvt. Kight started at once to install the new engine. At 2:30 a.m., May 10th, this engine was completely installed and ready to run. The engine was run in that morning and at noon May 10th, airplane No. 3 was on the line ready to do its share of the tow-target work which commenced at that hour.

The services rendered by the above-mentioned constituted a signal contribution to the success of the maneuvers, and it affords me genuine pleasure to make record of their accomplishments."

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The last P-12D airplane in the 36th Pursuit Squadron, Langley Fiels, Va., was ferried to March Field, Calif., by Lieut. B.S. Harrell, Air Corps, on June 4th.

NEW CLASS REPORTS AT ADVANCED SCHOOL

A total of 68 students, graduates from the Primary Flying School at Randolph Field, Texas, reported at the Advanced Flying School, Kelly Field, Texas, for the final four months of training, on July 1st. This class consists of 32 officers of the Regular Army, 33 Flying Cadets, and 3 foreign officers, namely, 1st Lieuts. Ismail Hickmet and Ismail Raif of the Turkish Army, and 1st Lieut. Fructuoso P. Saurez of the Mexican Army. This class is scheduled to graduate on October 15th, next. Below is given a summary of the flying and ground school training to be given this class:

Flying	Hours
Transition	15
Specialized	56
Instrument Flying	13
Cloud Flying	5
Night Flying (Local)	3
Day navigation	28
Night navigation	15
Total	135

Ground School	Hours
Attack Aviation	3
Bombardment Aviation	3
Bombardment Racks	3
Bombs and Explosives	4
Bomb Sights	6
Combat Orders	10
Cooperation with Artillery	24
Infantry Missions	10
Military Organization	4
Observation Aviation	8
Photo Interp and Photography	4
Pursuit Aviation	3
Code Practice (18 words per minute)	20
Reconnaissance	8
Signal Communications	12
Squadron Duties of Junior Officers	8
War Planning Principles	2
Trap Shooting	
Total	132

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The 37th Squadron, Langley Field, Va., is fast acquiring information necessary to the performance of its mission as Attack. Three officers and three enlisted men (Captain Schramm, 1st Lieut. Grussendorf, and Lieut. Sutherland (ACR), Staff Sgt. Miller, Corporal Martini and Pvt. 1st Class Hankey) have kust returned from a 10-day period of visiting the Third Attack Group at Barksdale Field, La., observing their tactics and acquiring some first hand information on the loading and laying of smoke as well as dropping some parachute bombs. The trip was made in three newly acquired A-8 type airplanes.

AIR FORCE CRUCIBLE REACTIONS

FOLLOWING out the purpose of an open forum discussion, the Air Corps News Letter article, entitled "The Air Force Crucible," in the issue of June 15, 1935, has caused a considerable amount of reaction within the Air Corps.

As one old field soldier phrased it, the attitude taken in the above referred to article was a typical case of "the ostrich hiding his head in the sand." It will be recalled that the author of "The Air Force Crucible" based his position upon the U.S. national policy as expressed in the National Defense Act and other supplementary legislation. These state that our national policy is one of defense. Carrying out that thought, the author presented the considerable advantages possessed by a land-based air force when combating any carrier-based air force which might be brought to attack the United States.

Comments of other students of the development of military aviation show that they believe that attack in the future will not be made by employing aircraft carriers to bring the military planes close to the shores of the country against which an attack is to be launched. They base their belief upon the history of the development, not only of military airplanes, but also of commercial airplanes, during the brief span of years during which airplanes have been the subject of intensive aeronautical engineering research. Recently, commercial engineers have been prolix in their claims that, insofar as commercial airplanes are concerned, the efficiency increases with the size. They are unable, at present, to see any limitation to this progression although, as with all other moving craft, such a limit will, no doubt, ultimately be reached.

In line with this trend of development, these students foresee for the military airplane of the future a great range, which will permit it to go from its base in the home country, across great distances, either over land or sea, and return to its home base for replenishment of ammunition, fuel and supplies. They state that, if this is to be the case, probably the best defense will be the possession of a force of similar airplanes which could be used to inflict adequate retaliation.

This school of thought bases its contention upon the analogy with the development of surface fleet operations. In the days of Drake and Nelson, surface fleets enabled the country possessing them to exercise domination over countries with seaboard cities, which were defended neither by fortifications nor an adequate navy. Such domination was in most cases exerted by the mere threat of inflicting damage for which no retaliation could be made. There appears to be considerable merit in the argument that a similar influence would be exerted by a country possessing a strong air force over such countries within the limit of its range of action as did not have adequate means of making reprisals.

In further support of their theory, these proponents point to the vulnerability of aircraft carriers and their accompanying escort of fleet vessels as they approach within the radius of action of shore-based aircraft. The advantage in range of shore-based planes over the carrier-based aircraft will always necessitate the aircraft carrier coming within the effective range of the airplanes operating from the shore before it is able to launch its planes to attack objectives on the land.

As indicating the vulnerability of surface craft to aircraft bombing, there are the known results of the submarine attacks of the World War. No direct relationship can, of course, be established between the effectiveness of aircraft bombing of surface vessels and of submarine torpedoing of them. However, the analogy is sufficiently close to afford an approximation to the probable results of aircraft bombing. The aircraft bombs can undoubtedly exert the same damaging effect against the surface vessels as do the torpedoes of the submarines. The airplanes have speed and altitude to counter-balance the concealment enjoyed by the submarine.

Submarines of the Central Powers sank the following surface vessels during the World War:

No.	Type	Tonnage
9	Battleship	124,645
12	Cruisers	118,009
4	Light Cruisers	19,230
22	Flotilla Leaders and Destroyers	16,620
3	Torpedo Boats	628
18 Misc.	(Sloops (Gunboats (Mine Sweepers	19,290
9	Submarines	3,900
77	Totals - tons	302,322
62	Fleet Auxiliaries	300,364
	Grand Total - tons	602,686

As early as 1921, General Douhet published his belief that the trend in military bombing airplanes should be toward greater air endurance (range), so that less and less of an enemy's territo-

ry would be immune to their attacks. General Douhet also advocated concentrating all of a country's air effort in long-range bombers, even to the exclusion of observation aircraft for the Army and Navy. He stated that for a country to provide other types of aircraft was to detract from the main effort. His thesis was predicated, principally, upon the premise that fighter aircraft could not successfully stop the attacks of bombardment aircraft against land or sea objectives. Although this premise was stated fourteen years ago, it appears to be coming more and more into general acceptance as the years go by. The tremendous difficulties presented in obtaining information of a bombardment formation's approach are intensified when such formation can approach from any point of the compass, and at almost any altitude within the capacity of the ceiling of the aircraft, and at a speed which, if it has not already reached 200 miles an hour, will soon do so.

Tacticians are fairly well agreed that successful results against the bombardment airplanes themselves will probably have to be secured by attack against these airplanes on the ground, when they are refueling and re-arming; by destroying the facilities of their bases, and, to a lesser extent, by attacking them in the air, especially upon their withdrawal after bombing an objective. The time lost in finding the objective and completing the bombardment may furnish the necessary element of time required for the fighter airplanes to place themselves across the path of the hostile bombardment in a position to attack them on the way back to their base.

Air Commodore Charlton, in his recent book, "War From the Air, Past, Present and Future," presents General Douhet's arguments and then proceeds to state the air-line distances from the frontiers of the various countries of Europe to the vital objectives of neighboring countries. If he does not definitely accept General Douhet's theory that hostile air effort will be concentrated upon attacking the vital objectives to be found in the enemy's country, he at least indicates that such a course of action would afford results redounding to the advantage of that country possessing the shortest lines of operation. An apparent inconsistency in this respect is Air Commodore Charlton's statement that bombardment would probably operate from bases far in the rear of the frontiers, in order to secure protection for the air bases. It is obvious that to do so would considerably lengthen the lines of operation for the bombardment airplanes and might thus result in converting an advantage in this respect into a disadvantage where the enemy country operated from bases close up to their own frontier. Air Commodore Charlton emphasizes the point that correspondingly greater effect can be brought to bear against enemy objectives the shorter the lines of operation become.

As fleets have developed, naval powers have studied the conversion of commercial vessels to fleet uses in time of war. In general, the experience has been that an effective conversion which would include the installation of protective armor and the elaborate fire control systems of naval vessels required too great a time to permit having the commercial vessels made available in time to be used effectively in the war. It does not appear that this experience will be repeated in the case of converting commercial airplanes to military use. This is due to the fact that protective armor has not been found suitable for use upon military airplanes, and to the further fact that most of the installations and equipment required for the successful operation of military airplanes will also be required for the satisfactory operation of commercial planes. This makes the problem of conversion a far simpler one in the case of aircraft than in the case of surface vessels. It is probable, however, that in making such a conversion, the saving in time may make it worth while to accept certain shortcomings in the military installations which are placed in the commercial airplane. For example, a commercial airplane of an equal gross weight with a given bombing airplane may not, after conversion, be able to carry more than perhaps half of the bomb weight of the military airplane, and it may have to carry this weight on racks mounted beneath the wings or fuselage, rather than in internal bomb bays, where they are protected from head resistance as they are in the military bomber.

All these considerations confront the student of the possibilities of air warfare of the future. As has been the case with the development of other forms of the military art, it may be expected that the final air strategy and tactics at the end of the next major war will be far different from what is visualized after a merely theoretical approach to the subject.

WAR TIME AIRMEN HOLD REUNION

MEMORIES of war-time days were revived on the occasion of the recent visit to the Air Corps Technical School at Chanute Field, Rantoul, Ill., of members of the former 267th Aero Squadron which was stationed at this field during the War. Members of this Squadron had a reunion in Champaign, Ill., and were accorded permission to visit Chanute Field in a body. Altogether, 22 of these World War veterans gathered in this well known college town, some of them coming from localities over 900 miles distant in order to meet the "Gang."

The Reunion was an inspiration and a success from every standpoint, and it was felt that every member present was well repaid for the time and money expended in making the effort to come to Champaign.

After the meeting was convened, a good fellowship session was held for an hour, everyone renewing old acquaintances and talking over old times. Then they gathered around the piano and sang the old songs they loved so well when the squadron was stationed in England.

The election of Louis K. Handorf and Lloyd Hessey, both of Indianapolis, as President and Secretary-Treasurer, respectively, for the ensuing year, was followed by a discussion as to the meeting place for the 1936 Reunion, and it was voted to hold it on May 31st at Indianapolis, Ind.

Throughout the entire meeting, different comrades spoke of the various happenings of the old 267th Squadron back in 1918. All letters and telegrams which had been received in the past 60 days from the different members residing in various parts of the United States were read and greatly enjoyed by all present. Many a laugh and a joke was had during the reading of these letters.

Touching on the visit to Chanute Field, Lee Stonebraker, retiring President, in recording the minutes of the Reunion, stated:

"Our experiences at Chanute Field were very different from the time we served there in 1918. We were met at Headquarters by Col. Junius Jones, Commandant of Chanute Field; Major Carey; Captain Anderson, Adjutant of the Post, and Captain Goddard, an authority on National Aerial Photography. These officers escorted us through the Field, the first stop being made at the Aerial Photography School where we saw a map of the City of Chicago, which was approximately 12 x 27 feet in size, taken over the City of Chicago by numerous exposures and pieced together absolutely faultlessly, being accurate in every respect. We also saw one of the greatest collection of aerial pictures that have ever been taken for the United States Government, and I think I am safe to say any place in the World.

They also explained in detail how these pictures were taken, and told us of one of the big projects of the Government at this time, that is, the making of aerial maps taken from an altitude of 25,000 feet. These different pictures, which look like a zigzag puzzle at the present time, will be fastened together accurately to make the first and only accurate aerial map of various areas of this size in the world. We saw among other things aerial cameras ranging in cost from $3,000 to $8,000; also moving pictures; how films are stored in a modern frigidair unit, and other equipment too numerous to mention.

From this building we went to one of the barracks at the northeast part of the field, equipped with a lounging room, pool tables, etc. From here the group was escorted to the old building which we would call the E. and R. building, known to the Squadron as the "Erection and Repairing of Airplanes Building," but now called the Woodworking Department. In this building we saw the modern way of repairing wings, doping of wings, instrument testing room, the propeller room, and the general repair of the wings and fuselage. This building is being changed shortly to accommodate work on all-metal planes, the wooden planes giving way to the all-metal planes. This work was explained to us very thoroughly by civilian instructor in charge, Mr. Browning. Here we learned that Mr. Drinkwater, known to most of the old gang, was still on duty.

Our next stop was at the Engine Testing Room. This building is given over to the repairing and reconditioning of airplane motors. We had a very interesting lecture on the tearing down and repairing of the modern airplane motors by civilian instructor, Mr. Jackson. He stated what they are trying to achieve is for every cubic inch of displacement in the motor to produce more horsepower. We saw motors ranging from 400 horsepower to 700 horsepower. There are two different types of motors used at the present time, the whirlwind motor and the liquid-cooled V-type stationary motor. He also gave us a very interesting discussion on superchargers.

From here we were taken to the barracks of the 267th, which looked very similar excepting the squadron now has a very nice lounging room in one end, being equipped with easy chairs, radio, magazines, smoking stands, etc., Instead of having double deck beds as we had, single

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beds are now used, with about twice the space between them as when we were at Chanute, otherwise the appearance of the barracks is practically the same as when we were stationed there.

We were next escorted to the hangar directly south of the barracks; these hangars were formerly divided into two sections, the partition now having been removed to accommodate the large bombing planes and the much larger planes they are using today than during the time of the war.

We next walked to the center of the field, where they have erected a new two-story building where the flyers obtain each hour of the day radio broadcasts and weather reports from all the commercial and government fields of the United States. They have divided the Country into 4 zones and know the weather conditions from Portland, Maine, to Portland, Oregon, every hour of the day. This is also a checking-in and checking-out station for Army flyers.

Photographic Officer of the Post, Captain Goddard, next took a picture of all the fellows of the 267th who attended this reunion, in front of one of the new type planes. This picture was taken at 5:30 p.m., and is a very good example of the high type photographic work they are doing at Chanute Field.

The surprise of the day followed when we were taken to one of the former hangars which is now occupied as an enlisted men's and Noncommissioned Officers' mess hall for the entire field. Here Major Carey, Post Mess Officer, had provided a fine 'Dutch Lunch' for everyone present. You have no idea what satisfaction and thrill this gave all the members present to sit down together again in the old field for mess."

Returning to Champaign following their enjoyable visit to Chanute Field, the veterans attended a banquet at the leading hotel, and a good time was had by all. The chief entertainer was a member of the old outfit, Victor J. Beasley, assisted by Harry Curzon, a Champaign ex-Service man. Describing his various feats of legerdemain, the minutes state:

"He took dollar bills out of our pockets, burned them up, and returned them to us in a lit cigarette. He also took quarters away from us and returned them to us in a fresh egg, breaking the shell and returning the money within the egg; also cutting a banana in three parts and never cutting the skin; so if any of you fellows happen to meet this man in your travels you had better watch your step. He is liable to take out your gold fillings."

Following speeches by incoming and retiring officers, the banquet came to a close with the winging of "Old Lang Syne" by all present.

We wonder how many more war-time outfits have banded together and are keeping fresh the memories of their war service as is being done by the veterans of the 267th Squadron? All of us are wont to allow our memories to drift back to bygone days and, whether it is an actual fact or not, talk of them as "the good old days."

The example set by the Commanding Officer of Chanute Field and the officers under him in according all possible courtesies to the visiting veterans is worthy of emulation by every army post in the country. These veterans, inspired solely by patriotic motives, answered their country's call in a time of emergency. Their service then was most highly appreciated and they were heroes in the eyes of all. But, alas, their heroic deeds and the many sacrifices they made for their country's cause are all too soon forgotten. Who has a better right to expect the hand of friendship and courtesies from military men than the war veteran?

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CRISSY FIELD COMPLETES AIRPORT QUESTIONNAIRES.

The Chief of the Air Corps recently sent a letter of appreciation to the Commanding Officer, Crissy Field, Calif., expressing his satisfaction on the excellent performance of Crissy Field in completing within a very short period the questionnaires covering airports in the San Francisco Bay Strategic Area. The Commanding Officer also supplied excellent photographs of each of the airports covered, and the record thus furnished forms valuable information for the Office Chief of the Air Corps and the General Headquarters Air Force in preparing training exercises and maneuvers, as well as plans covering the area concerned.

The progress throughout the Air Corps in completing these questionnaires has been satisfactory. It is probable that in many cases questionnaires have been completed and are being held until all questionnaires covering the area are completed, when all will be forwarded together. When all these questionnaires are received the Air Corps will have a record of over 600 airports, with information in sufficient detail to enable the formulation of plans for training exercises and maneuvers for all strategic areas of the Continental United States.

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Colonel Alva J. Brasted, Chief of Chaplains, was a recent visitor at Kelly Field, Texas, for the purpose of giving a character building talk to the personnel at that station. This was his first official visit as Chief of Chaplains to all Regular Army posts, including CCC Camps.

Colonel Brasted was accompanied by Col. Jacob E. Fickel, Commandant, and Captain E.R. Martin, Chaplain, at Kelly Field.

WEATHER FLIGHTS BY PILOTS OF WASHINGTON NATIONAL GUARD
By the News Letter Correspondent

Washington's 41st Division Aviation, National Guard, Felts Field, Spokane, commanded by Major Robin A. Day, Air Corps, Instructor, has just completed a unique record that has brought distinction to both the commissioned and enlisted personnel of that organization.

Reported by Malcolm Rigby, Felts Field airways weather observer, as being the only National Guard Air Corps unit in the United States to render such a service, the 41st Division Aviation has just completed one year of making volunteer "weather hops" to the higher altitudes.

During the past year Regular pilots at seven Army and Navy stations, each, have assisted the Weather Bureau with its experimental studies of the upper weather conditions.

The inauguration of "weather hops" started on July 1, 1934, with pilots of the 41st Division Aviation receiving no compensation other than gasoline mileage for their cars to the field. For the first few months, the flights were made at 1:00 a.m., so as to correspond with weather reports secured from similar flights in the eastern section of the country. Douglas O-38E Observation planes were used generally for the work, with the device that holds the weather recording instrument installed on the left wing.

The airplane was equipped with oxygen for use by the pilots at higher altitudes. The radio equipment consisted of the SCR 134 set, through which communication was kept with either the Division Aviation ground station or Department of Commerce station.

During the 365 days, flights were made every day with the exception of 56 days. Six days of extremely bad weather made weather flights impossible. On 43 days the airplanes were away on extended navigation flights, and on 7 days the weather recording instrument was out of commission. On 11 days, two flights were necessary because of bad conditions. There were a total of 320 flights, ranging in altitude from 6500 to 22,300 feet. The average altitude was 18,500 feet. An average of 80 minutes was necessary to complete each flight, or a total of 440 hours flying time for the year.

"During all this time there were only two occasions when the pilot did not return to Felts Field," related Mr. Rigby, "and that was because the clouds closed in, making landing necessary at Pasco and Deer Lake, Washington.

This is the first time that upper air current observations have been made in the Northwest. From these observations we discovered that over Spokane we have the lowest mean temperature in the United States, and also the highest humidity.

At 17,000 feet altitude we found a temperature of 40 degrees below freezing. From this we have determined by our observations that this temperature is lowest when storms are approaching this area.

From data gathered on these flights we are now determining the type of clouds in which ice is most encountered by airplanes. Comparing our night and day flight records, we have learned that there is a 30 degrees temperature inversion in the night flights."

During the weather flights the pilots and observers used 12 tanks of oxygen. Weather Bureau rules by which the flights were made provided that, after reaching certain definite altitudes, the pilots should fly level for a brief time in order to permit the weather instrument to make the proper recordings.

On these flights every pilot agrees that he received exceptional and valuable training, particularly in blind and instrument flying. Many of the flights required navigation through several layers of clouds, and landings with none too high ceilings. In instances of low ceilings voice communication was maintained with the field stations.

Felts Field, with its beacon and its boundary well lighted, proved to be an excellent base from which to carry on such operations during the night. This field is practically two miles long and more than three-quarters of a mile wide.

Closeness of the airport to Spokane also proved beneficial as pilots coming down through bad weather were able to check their bearings by the light spot created in the weather from thousands of lights in the city.

"The work by the 41st Division Aviation is a splendid example of cooperation between two branches of government, and the Weather Bureau has nothing but unlimited praise for the outstanding work by the 41st Division National Guard Aviation," said Mr. Rigby.

While some pilots, with more time available from their private business than others, did more Weather Bureau flying, every pilot in the Division Aviation assisted with the flights. Each pilot got at least 10 hours of weather flying.

"I am proud of the record made by the pilots in the organization, who started making the weather hops before my assignment with the squadron," said Major Day. "I was glad to see the policy continued."

A contract for weather flights has been awarded a commercial operator.

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BIOGRAPHIES

LIEUT.-COLONEL MILLARD F. HARMON, JR.

Lieut.-Colonel Millard F. Harmon, Jr., Air Corps, Commanding Officer of the 20th Pursuit Group at Barksdale Field, Shreveport, La., was born at San Francisco, Calif., January 19, 1888.

Following his graduation from the United States Military Academy June 12, 1912, he began his military career as a second lieutenant of Infantry, and was stationed successively in Minnesota, Kentucky, Texas, and the Philippines. While serving with the 27th Infantry he was, in November, 1915, attached to the Aviation Section, Signal Corps, and assigned to undergo flying training at the Signal Corps Aviation School at San Diego, Calif. Completing this course on October 15, 1916, he was later attached to the 1st Aero Squadron with the Punitive Expedition into Mexico.

In February, 1917, he was one of three American officers sent abroad to go through the French schools with a view to acquiring a knowledge of methods employed in France for their training of aviation personnel.

During the World War, Lieut.-Col. Harmon was on duty connected with the inspection and laying out of landing fields and, in addition, performed various other staff assignments. For a brief period he commanded t e First Air Depot, and later served as pilot with French Escadrille 65. For his service with this organization he was highly commended by the commander of the French Combat Squadron No. 2, who stated that he (Major Harmon) insisted in taking part in all of the patrols of that Escadrille and had made besides a great number of voluntary patrols, thus setting the very best example of enthusiasm and of scorn of danger.

Recalled from duty in France in May, 1918, Lieut.-Col. Harmon was ordered to Washington and assigned to duty as Chief of the Flying Branch, Schools Section, Office of the Director of Military Aeronautics. He was rated Junior Military Aviator, June 16, 1917. On August 6, 1918, he was designated as Assistant Chief of the Training Section, in charge of heavier-than-air training.

Relieved from duty in Washington in October, 1918, he was assigned to the command of the First Provisional Wing at Mineola, L.I., New York, and served in this capacity until January, 1919, when he was ordered to Panama to assume command of the air forces to be placed in operation in the Canal Zone. In addition to serving as Commanding Officer of France Field, Panama, he also performed the duties of Department Air Service Officer, Panama Canal Department.

In April, 1921, Lieut.-Colonel Harmon was assigned to duty in the Office of the Chief of Air Service, serving there until January, 1922, as a member of the Advisory Board and then in the Training and War Plans Division.

Assigned as student at the General Service Schools, Fort Leavenworth, Kansas, in the fall of 1923, he graduated therefrom in June of the following year and then went to school another year, this time at the Army War College. His graduation was followed by several months' duty at Bolling Field, D.C., as commanding officer, and in September, 1925, he was assigned as a member of the War Department General Staff.

With the reestablishment of March Field, Riverside, Calif., as a Primary Flying School, he was, in April, 1927, assigned as Commandant thereof, performing this duty until August, 1930, when he was placed on duty at Fort Leavenworth, Kans., as Instructor at the Command and General Staff School. In June, 1932, he was assigned to duty at Barksdale Field, La., as Commanding Officer of the 20th Pursuit Group. By virtue of this assignment, he holds the temporary rank of Lieut.-Colonel.

Lieut.-Col. Harmon has over 2,000 flying hours to his credit. For his service overseas during the World War, he received from the French Government the Croix de Guerre with star.

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LIEUT.-COLONEL GEORGE C. KENNEY

Recognized as one of the outstanding officers in the Air Corps, Lieut.-Colonel George C. Kenney received concrete evidence of the high regard in which he is held by his superiors when, upon the organization of the GHQ Air Force on March 1, 1935, he was promoted from Captain to the temporary rank of Lieut.-Colonel and assigned to duty as Assistant Chief of Staff, G-3, GHQ Air Force, Langley Field, Va. He entered the military service during the World War and served overseas for a period of 18 months, all but two months of this service being with the 91st Aero Squadron.

Born at Yarmouth, Nova Scotia, Canada, August 6, 1889, he passed through grammar school and high school in Boston, Mass., and attended the Massachusetts Institute of Technology, Cambridge, Mass., for three years. For six years thereafter he was engaged in civil engineering work and as a contractor and, on June 2, 1917, enlisted as a Private in the Aviation Section, Signal Corps, with a view to becoming a flyer. Assigned to pursue the aeronautical ground school course at the institution of learning he previously attended - the Massachusetts Institute of Technology - he was, upon the completion of this course, assigned on July 25, 1917 to Hazelhurst Field, Mineola, L.I., New York, for flying training, and passed the required tests for the rating of Reserve Military Aviator on September 14, 1917.

On November 8, 1917, he accepted a com-

mission as 1st Lieutenant, Aviation Section, Signal Corps, and, assigned to active duty with the 14th Foreign Detachment, he proceeded overseas with this organization and began advanced flying training on December 16, 1917, at the Third Aviation Instruction Center at Issoudun, France.

Upon the completion of this advanced training, on February 13, 1918, he was a student for a brief period at the First Corps Observation Training Center at Amanty, France, and on February 22, 1918, was assigned to the 91st Aero Squadron. He was on duty with this organization for a period of nearly 16 months, during which time it was under the orders of the French 8th Army from May 24 to September 4, 1918; the First American Army from September 4 to Nov November 16, 1918, and the Third American Army from November 16 to April 9, 1919.

Lieut.-Colonel Kenney piloted the Salmson type airplane on the Toul and Meuse-Argonne Sectors, accumulating a total of about 110 flying hours over the front lines and engaging in twelve combats. He was credited with the destruction in aerial combat of two enemy aircraft, and was awarded the Distinguished Service Cross for extraordinary heroism in action near Jametz, France, October 9, 1918, the citation accompanying same being as follows:

"This officer gave proof of his bravery and devotion to duty when he was attacked by a superior number of aircraft. He accepted combat, destroying one plane and drove the others off. Notwithstanding that the enemy returned and attacked again in strong numbers, Lieutenant Kenney continued his mission and enabled his observer to secure information of great military value."

Lieut.-Col. Kenney was promoted to Captain, March 18, 1919. He acted as flight commander while the 91st Squadron, serving with the Army of Occupation, was located at Treves and Coblenz, Germany. He was detached from the Squadron on June 2, 1919, and returned to the United States, being stationed at Mitchel Field, L.I., New York, until his transfer to Kelly Field, Texas, in August.

Assigned to the 8th Aero Squadron at McAllen, Texas, on October 12, 1919, he served for ten months as pilot and commanding officer of this squadron, flying the DH-4 airplane on border patrol missions. Following two months of temporary duty at Fort Knox, Ky., where, flying the DH4-B airplane, he was engaged in artillery adjustment work, he was detailed on November 1, 1920, as a student at the Air Service Engineering School at McCook Field, Dayton, O.

For two years, following his graduation from the Engineering School, he was on duty as Air Service Inspector at the plant of the Curtiss Aeroplane and Motor Corporation at Garden City, Long Island, N.Y.

Returning to the Engineering Division at McCook Field in June, 1923, he occupied successively the positions of Chief of the Factory Section, Contracting Officer, and Chief of Production Engineering.

Detailed as a student at the Air Corps Tactical School, Langley Field, Va., in September, 1925, he completed the course in June of the following year. He next completed the one-year course at the Command and General Staff School, Fort Leavenworth, Kansas, and returned to Langley Field to assume the duty of Instructor at the Tactical School.

From September, 1932, to June, 1933, he was a student at the Army War College, Washington, D.C., and, upon his graduation, was assigned to duty in the Plans Division, Office of the Chief of the Air Corps, where he remained until he was assigned to staff duty with the GHQ Air Force.

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A CLUBHOUSE FOR FLYERS AT PITTSBURGH

The "Flyers Club," erected and furnished by the Commissioners of Allegheny County, Pittsburgh, Pa., for the benefit of all pilots, military and civilian, was formally dedicated on Saturday, May 18th. Colonel Charles C. McGovern, Chairman of the Board of Commissioners, was the prime mover in seeing that the Club was rushed to completion in record time, about sixty days. He personally spent many hours at the airport, seeing that all went well with the Club. Among Air Corps officers who were guests of the Flyers Club on the opening day were General Westover and Captain Trunk, of the Office of the Chief of the Air Corps; Colonel Frederick L. Martin and Captain Elmer E. Adler, of the Army War College. Members of the Pennsylvania National Guard Air Corps present on this occasion were Major Victor Dallin, Captain George R. Dickens and Lieut. Claude Craven.

The Flyers Club is Colonial in design, and the Colonial spirit has been followed throughout the house. It has accommodations for twenty pilots overnight, and to date there have been approximately fifty Air Corps pilots who have made use of its accommodations.

All Air Corps officers on cross-country flights are invited to make use of the Flyers Club as guests of Allegheny County.

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A Board of Air Corps officers, consisting of Brigadier Generals James E.Chaney, Frank M. Andrews, Henry C. Pratt and Lt.-Colonel Arnold N. Krogstad, was appointed by the War Department for the purpose of making flying proficiency classification of all commissioned officers of the Air Corps, under provisions of W.D. Circular 6.

AUTOMATIC DEVICE FOR SWITCHING FUEL TANKS

THE Air Corps Materiel Division is constantly striving to develop various aids for the airplane pilot to safeguard flying to the utmost possible extent. In the efforts put forth to prevent forced landings due to fuel system difficulties, the Division has developed a device which will insure the continuous operation of the engine in the event of the failure of the pilot to "switch tanks" at the proper time. This aid to the pilot is embodied in a fuel-system design in which the changing from an empty tank to a full one is performed automatically.

The pilot is warned by a light when the main or auxiliary supply is exhausted, but fuel is drawn from the other supply or reserve, whether the pilot turns the fuel cock or not. Whether the desirable features of this fuel system will warrant the additional complication can only be determined by installation in an airplane and through experimental and service test, which will probably extend over a period of two years.

Another proposal is the installation of a warning device which will indicate when the fuel supply is exhausted sufficiently early to enablethe pilot to switch tanks before the engine stops. Such a signal, consisting of a red light on the instrument panel, is being developed. One of the actuating devices is merely a fuel pressure-operated switch which will light the signal when the pressure drops, giving the pilot ten seconds or more in which to switch tanks. A quantity of such units is being procured for installation on airplanes in service. The other devices operate the signal switch by means of a float mechanism and incorporate a reserve of two or four quarts of fuel which will operate the engine from one to three minutes after the pilot has been warned. One of these units has undergone a successful flight test and will be service tested.

Of the proposed systems, Materiel Division engineers believe that the simple pressure-operated switch and signal light will prove most satisfactory, due to its lack of floats, levers, check valves, and extra plumbing, which are potential sources of trouble. The belief is further expressed that a short period of warning, requiring immediate action, will be more effective than one of a minute or more, as in the latter case the pilot might, if busy, postpone turning the fuel cock, depending on the longer period of time, misjudge the time, or have his attention turned to other matters.

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TEMPORARY PROMOTION OF AIR CORPS OFFICERS

To Lieutenant-Colonel

Major William B. Mayer, 19th Composite Wing, Albrook Field, assigned as Commander, Panama Air Depot, France Field, Panama, July 11,1935.

To Major

Captain Harold G. Peterson assigned as Commanding Officer, 65th Service Squadron, Luke Field, T.H., July 3, 1935.

Captain Ray H. Clark assigned as Commanding Officer, 19th Pursuit Squadron, Wheeler Field, T.H., July 3, 1935.

1st Lieut. Russell L. Williamson assigned as Supply Officer, Fairfield, O., Air Depot, June 30, 1935.

Captain Gilbert T. Collar assigned as Supply Officer, 19th Composite Wing, Albrook Field, Canal Zone, July 11, 1935.

Captain Albert B. Pitts assigned as Commanding Officer, Philippine Air Depot, July 10,'35.

To Captain

1st Lieut. Willard R. Shephard assigned as Intelligence and Operations Officer, 2nd Observation Squadron, Philippines, July 10, 1935.

1st Lieut. George W. Hansen assigned as Flight Commander, 28th Bombardment Squadron, Philippines, July 10, 1935.

1st Lieut. John P. Kenny assigned as Flight Commander, 28th Bombardment Squadron, Philippine Dept., July 10, 1935.

To Captain (Continued)

1st Lieut. Russell Scott assigned as Flight Commander, 5th Bombardment Squadron, Mitchel Field, N.Y., June 26, 1935.

1st Lieut. Dixon M. Allison assigned as Engineer and Armament Officer, 1st Pursuit Group, Selfridge Field, Mich., June 30, 1935.

1st Lieut. Jack W. Wood assigned as Flight Commander, 4th Observation Squadron, Hawaiian Department,

1st Lieut. Lewis R. Parker assigned as Engineer and Armament Officer, 5th Composite Group, Hawaiian Department.

1st Lieut. Walter C. White assigned as Flight Commander, 1st Bombardment Squadron, Mitchel Field, N.Y., June 30, 1935.

1st Lieut. Harry G. Montgomery, Jr., assigned as Flight Commander, 50th Observation Squadron, Luke Field, T.H., July 4, 1935.

1st Lieut. Raymond L. Winn assigned as Flight Commander, 26th Attack Squadron, Wheeler Field, T.H., July 4, 1935.

1st Lieut. Richard H. Lee assigned as Intelligence and Operations Officer, 26th Attack Squadron, Wheeler Field, T.H., July 4, 1935.

To 1st Lieutenant

2nd Lieut. Benjamin J. Webster assigned as Transport Officer, 75th Service Squadron, Wheeler Field, T.H., July 4, 1935.

To 1st Lieutenant

2nd Lieut. Edwin G. Simenson assigned as Supply Officer, 50th Observation Squadron, Luke Field, T.H., July 4, 1935.

2nd Lieut. Daniel S. Campbell assigned as Supply Officer, 26th Attack Squadron, Wheeler Field, T.H., July 4, 1935.

2nd Lieut. William G. Beard assigned as Communications Officer, 72nd Bombardment Squadron, Luke Field, T.H., July 4, 1935.

2nd Lieut. Ivan L. Farman assigned as Signal Officer, Air Corps Technical School, Chanute Field, Ill., June 30, 1935.

2nd Lieut. John J. Hutchison assigned as Armament Officer, 72nd Bombardment Squadron, Luke Field, T.H.

2nd Lieut. Donald L. Hardy assigned as Supply Officer, 50th Observation Squadron, Luke Field, T.H.

2nd Lieut. Byram Bunch assigned as Armament Officer, 23rd Bombardment Squadron, Hawaii.

2nd Lieut. John M. Price assigned as Armament Officer, 25th Bombardment Squadron, France Field, Panama, June 16, 1935.

2nd Lieut. Samuel A. Mundell assigned as Communications Officer, 44th Observation, Albrook Field, June 28, 1935.

2nd Lieut. Robert H. Landry assigned as Supply Officer, 78th Pursuit Squadron, Albrook Field, Canal Zone, June 28, 1935.

2nd Lieut. Charles A. Clark, Jr., assigned as Commanding Officer, 6th Photo Section, Philippine Department, July 10, 1935.

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The following-named Air Corps officers, holding temporary increased rank, were assigned to other duties but continue to hold such increased rank:

Lieut.-Colonel Junius H. Houghton from duty with Panama Air Depot to Commanding Officer, 6th Composite Group, France Field, Panama.

Captain Archibald Y. Smith as Flight Commander, 49th Bombardment Squadron.

Captain Robert E.L. Choate as Intelligence and Operations Officer, 49th Bombardment Squadron, Langley Field, Va.

1st Lieut. David H. Kennedy as Supply Officer, 49th Bombardment Squadron, Langley Field.

1st Lieut. David H. Baker from Armament Officer, 78th Composite Squadron, Albrook Field to duty as Adjutant, 16th Pursuit Group.

Captain Elmer J. Rogers, Jr., from 4th Observation Squadron, Luke Field, to Intelligence and Communications Officer, 18th Composite Wing, Fort Shafter, T.H.

1st Lieut. Lawrence B. Kelley from Armament Officer to Supply Officer, 25th Bombardment Squadron, France Field, Panama.

Captain Charles G. Goodrich from 36th Pursuit Squadron, Langley Field, to duty as Supply Officer, 58th Service Squadron.

1st Lieut. Frederick E. Calhoun from 13th Attack Squadron to Adjutant, 3rd Attack Group, Barksdale Field, La.

Captain Homer L. Sanders from 26th Attack Squadron, Wheeler Field, to Flight Commander, 6th Pursuit Squadron, Wheeler Field.

1st Lieut. Donald L. Hardy, 50th Observation Squadron, to Supply Officer, 4th Observation Squadron, Luke Field, T.H.

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OFFICERS RELIEVED FROM TEMPORARY RANK

Colonel John F. Curry relieved from duty as Commandant, Air Corps Tactical School, Maxwell Field, Ala., June 30, 1935.

Lieut.-Colonel Claude E. Duncan relieved from duty with 1st Wing, March Field, Calif., July 26, 1935.

Captain Robert L. Easton from duty with 26th Attack Squadron, effective upon date of departure from Hawaii.

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CHANGES IN STATION OF AIR CORPS OFFICERS

To Bolling Field, D.C.: Captain Henry R. Baxter from Panama. Relieved from temporary rank effective on date of departure.

To Kelly Field, Texas: 1st Lieut. Charles E. Densford, 4th Observation Squadron. Relieved from temporary rank upon departure from Hawaii.

To Langley Field, Va.: Major Hugh C. Downey, from Mitchel Field, N.Y., to duty with station complement. Relieved from temporary rank, June 26, 1935.

To San Diego, Calif.: Captain Leland C.Hurd from duty as Air Corps representative at Curtiss Aeroplane and Motor Co., Buffalo, N.Y., to duty as Air Corps representative at plant of Consolidated Aircraft Corporation.

To Fort Leavenworth, Kansas: Captain Harry A. Johnson for duty as student at Command and General Staff School.

RELIEVED FROM DETAIL TO AIR CORPS: 2nd Lieuts. Charles E. Brown, Donald F. Buchwald, Paul Burlingame, Stephen O. Fuqua, Infantry; Richard T. Coiner, Jr., Cavalry; Horace L. Sanders, Field Artillery; Paul E. Ruestow, Corps of Engineers.

TRANSFERS: 1st Lieut. Leslie A. Skinner to the Ordnance Department, May 28, 1935, with rank from August 1, 1929.

PROMOTIONS: to 1st Lieutenant: 2nd Lieut. Louis E. Massie, rank June 7, 1935; 2nd Lieut. Stuart P. Wright, rank June 12, 1935.

ORDERS REVOKED: Relief of Major Phillips Melville from assignment and duty with 5th Composite Group and from temporary rank and his assignment to Randolph Field, Texas.

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AIR CORPS OFFICERS TO ATTEND UNIV. OF MICHIGAN

The following-named officers were detailed for duty as students at the University of Michigan, Ann Arbor, September 16, 1935:

1st Lieuts. Louis E. Massie, upon completion of present course of instruction at Air Corps Technical School, Chanute Field; Robert W. Stewart, Fort Bragg, N.C.; 2nd Lieuts. Samuel O. Redetzke, 62d Service Squadron, Brooks Field, and Herbert H. Tellman, Supply Officer, 1st Pursuit Group, Selfridge Field, Mich. Two last named officers relieved of temporary rank, that of Captain, September 15, 1935.

BOEING TEST BOMBER, MODEL 299

The War Department recently issued the following announcement relative to a new type of Bomber constructed by the Boeing Company:

"Hailed as the fastest and longest range Bomber ever built, a giant four-engined all-metal airplane, today was brought to light by the Boeing Aircraft Company of Seattle after more than a year of work on the project.

Known merely as the Boeing 299, the huge craft shortly will undergo test flights before being submitted to the United States Air Corps in open competition with other types at Dayton, Ohio. These tests, it was announced, are expected definitely to stamp the plane as the most formidable aerial defense weapon ever offered this country, with far more speed and a substantially greater cruising range than any bomber ever before produced.

Military secrecy necessarily shrouds many details of the Model 299. Boeing officials said, however, that it would meet or exceed specifications of the Air Corps as set forth in a public call for bids and equipment.

Among other things, these requirements are known to call for a high speed of from 200 to 250 miles an hour at 10,000 feet altitude, for an operating speed of from 170 to 220 miles an hour at the same altitude, for an endurance at operating speed of from six to ten hours, and for a service ceiling of from 20,000 to 25,000 feet.

The Boeing "aerial battle cruiser" has a wing span of approximately 100 feet, length of 70 feet, height of 15 feet, and gross weight of about 15 tons. It is of the all-metal mid-wing type, equipped with four Hornet engines of over 700 horsepower each, and with the new Hamilton Standard three-bladed constant speed propellers. Clean streamlining is a feature, with retractable landing gear and tail wheel as further aids to speed. Officials declare the plane to be the first military type which will be able to complete a mission in the event one engine ceases to function.

A number of new armament installations, developed by Boeing engineers, are carried in addition to the latest types of flight and engine instruments, including an automatic pilot, two-way radio telephone equipment and a radio "homing" device. Air brakes are used for the first time in any American aircraft, with these as well as the craft's wheels and tires having been especially developed.

Construction is of typical Boeing semi-monocoque type, the structure consisting of longerons, skin stiffeners, bulkheads and smooth outside metal skin.

The Model 299 makes its bow as the latest in a long line of Boeing achievements dating from 1916. Among those in recent years have been the company's high-speed twin-engined bomber of 1931 and commercial transport plane of 1933, both of which established the current trend in aircraft design and construction.

An entire fleet of the transports, known as the Model 247-type, today is operating on the routes of United Air Lines, Pennsylvania Airlines, National Park Airways, Western Air Express and Wyoming Air Service. In addition, single-seater Boeing fighters are regular equipment at Army Air Corps bases, at Navy shore stations and on Uncle Sam's aircraft carriers."

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BOARDS TO PASS ON PURSUIT AND CARGO PLANES

Under Special Orders of the War Department recently issued, two boards of Air Corps officers were appointed, to meet at the call of the president thereof, at Wright Field, Dayton, Ohio, on a date to be set by the Chief of the Materiel Division of the Air Corps, for the purpose of evaluating as to utility of type and landing and take-off characteristics, the two-place and single Pursuit airplanes submitted under circular proposals No. 35-48 and 35-49, and the cargo airplanes submitted under circular proposal No. 35-29.

Officers of the Board to consider the Pursuit types of airplanes comprise Lieut.-Cols. Millard F. Harmon, Jr., Barksdale Field, La.; Ralph Royce, Selfridge Field, Mich.; Adlai H. Gilkeson and Major Harold H. George, of Langley Field, Va.; Major Claire L. Chennault of Maxwell Field, Ala.; Captains Ross G. Hoyt of the Office of the Chief of the Air Corps, Washington, and Ployer P. Hill, of Wright Field Dayton, Ohio.

The Board appointed to pass upon the merits of the cargo airplanes consists of Majors John F. Whiteley, Orlo H. Quinn and Captain Russell A. Wilson, Langley Field, Va.; Major Harrison W. Flickinger, of the Fairfield, O., Air Depot; and Captain Ployer P. Hill, of Wright Field, Ohio.

The proceedings of these Boards will be submitted to the Secretary of War, through the Chief, Materiel Division, Air Corps, pursuant to the provisions of Section 10 (b) Air Corps Act of 1926.

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BOMBING COMPETITION BY 35TH PURSUIT PILOTS

The 35th Pursuit Squadron, Langley Field, Va., completed its gunnery and bombing, both practice and record. Lieut. Knoeger, Reserve, who reverted to inactive status June 30th, was high man with a total score of 1113.

Three teams of three men each were organized for an informal competition in formation bombing. Each man dropped six bombs, a total of 18 bombs per element, with a possible total of 450 points. Captain Rowe's element won the competition with 300 points, Major Waller's was second with 295, and Captain Peaslee's third with 161 points.

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